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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,957	03/15/2004	Sarah K. Patch	GEMS8081.195	9964
27061 7590 11/25/2009 ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (GEMS) 136 S WISCONSIN ST PORT WASHINGTON, WI 53074			EXAMINER CHAO, ELMER M	
			ART UNIT 3737	PAPER NUMBER
			NOTIFICATION DATE 11/25/2009	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/800,957	<b>Applicant(s)</b> PATCH, SARAH K.	
	<b>Examiner</b> ELMER CHAO	<b>Art Unit</b> 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. Acknowledgement is made of the amendment filed 7/23/2009.

#### ***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. **Claims 20-23** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding **claims 20**, the state-of-the-art in the field of computer readable media suggests that such medium can take both tangible forms and non-tangible or transitory forms (such as signals and carrier waves). Since the broadest reasonable interpretation of the limitation "computer readable medium" not only takes into account the disclosed invention but also the level of skill in the art, it would be reasonable to conclude in this case that the claim is broad enough to read on both a statutory and non-statutory embodiment.

Regarding **claims 21-23**, the claims are rejected due to their dependence from claim 20.

#### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claims 1-12, 20-23, and 24-26** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding **claims 1 and 20**, the limitation “that cannot be accessed by TCT transducers” is not supported by the Specifications. The word “access” or “accessed” cannot even be found in the Specifications.

Regarding **claim 24**, the limitation “mirrored” is not supported by the Specifications.

Regarding **the remaining claims**, they are rejected due to their dependence from the independent claims.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claims 1-12, 20-23, and 24-26** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding **claims 1 and 20**, the limitation “that cannot be accessed by TCT transducers” and “not accessible to a TCT transducer” is not clearly defined or described by either the Specifications or the claims and would be indefinite when read by one of ordinary skill in the art.

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Regarding **claim 24**, the act of mirroring transducer locations is not clearly defined or described by the Specifications or the claims and would be indefinite when read by one of ordinary skill in the art.

Regarding the remaining claims, the claims are rejected due to their dependence from the independent claims.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 1-2, 5-9, 13, 16-19, and 24-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruger (U.S. 6,216,025 B1) in view of Bae et al. (U.S. 2007/0140541 A1).

Regarding **claims 1-2, 9, 13, 16-19, and 24-26** Kruger teaches a method of imaging a breast comprising the steps of: projecting high frequency energy (C4, L46-47, "...microwave or radio wave energy...") toward a breast to induce thermal expansion of tissue in the breast positioned inside hemispherical shaped imaging tank (Fig. 1, Item 14) having a fluid disposed therein, the fluid having dielectric and ultrasonic properties similar to that of breast tissue (C4, L27-34; C5, L5-8) with an energy source (C4, L49-51; Fig. 1, Item 22) to detect a tumor in the breast (C5, L11-15); receiving ultrasonic emissions from a first portion of the breast resulting from the thermal expansion (C6,

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L17-21, "Following each pulse of radiation...signals recorded by each of the transducer elements...") by means of one or more sensors placed along an external surface of the tank (Fig. 2, Item 33); generating a first TCT dataset from the ultrasonic emissions (Fig. 12A, Item 92).

Kruger may not explicitly teach creating a second TCT dataset by extrapolating data from the first TCT set. However, in the field of tissue imaging and reconstruction, Bae et al. teach interpolating imaging data from acquired imaging data (para [0054]). Furthermore, Bae et al. also teach that the interpolation process being involved for areas that cannot be accessed by the CT imager (the finer-resolution slices were not able to be generated by the imager for reasons such as time constraints, imaging capacity, or other technology limitations. The areas can thereby be considered non-accessible). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kruger to include generating a second TCT dataset image data in order to produce a higher reconstruction interval for a 3D dataset (for motivation see para [0054], last sentence).

Regarding **claims 5-8**, Kruger teaches the step of impulsively and periodically pulsing the imaging object (Fig. 12B, Item 108, the step describes varying the period between a range of numbers, which can be varying "impulsively," or set constant, "periodically."). Also, the RF pulses are both uniform and selective (Fig. 2, Item 14, see the wave propagate in the hemispherical bowl in a uniform manner, as it is selectively sourced from the bottom of the bowl).

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10. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kruger in view of Bae et al. as applied to claim 1 above, and further in view of Takashima (JP363211879). Kruger and Bae et al. teach the method of acquiring the first set of TCT data and determining the second set of TCT data. They do not disclose the method of reducing the shading of an image. However, Takashima '879 teaches a method of shading correction by superposing parabolic waveforms or triangular pulses (abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kruger and Bae et al. to correct the shading of the image generated by the two data sets. Such a modification is advantageous when imaging because the image would be made clearer and easier to view by reducing the shading of it.

11. **Claims 10-12 and 14-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruger in view of Bae et al. as applied to claims 1 and 13 above, and further in view of Ben-Haim et al. (U.S. 2002/0065455 A1). Kruger and Bae et al. teach the limitations as discussed above. Kruger does not teach using a TCT data set to determine a second set of TCT data through the use of a Legendre Polynomial. However, Ben-Haim et al. teach the use of a Legendre Polynomial (Para 149). It would have been obvious to a person of ordinary skill in the art to modify Kruger and Bae et al. to include the use of a Legendre Polynomial. Such a modification is useful in assisting in the imaging of the imaging object at remote locations, as evidenced by Ben-Haim et al.'s use of it in determining the location and orientations of remote objects (Para 157).

12. **Claims 20, 21, and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruger in view of Bae et al., and further in view of Ben-Haim et al. Kruger and Bae et al. teach the limitations as discussed above. Kruger does not teach using a TCT data set to determine a second set of TCT data through the use of a Legendre Polynomial. However, Ben-Haim et al. teach the use of a Legendre Polynomial (Para 149). It would have been obvious to a person of ordinary skill in the art to modify Kruger and Bae et al. to include the use of a Legendre Polynomial. Such a modification is useful in assisting in the imaging of the imaging object at remote locations, as evidenced by Ben-Haim et al.'s use of it in determining the location and orientations of remote objects (Para 157).

13. **Claim 22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kruger in view Bae et al. as applied to claim 20 above, further in view of Ben-Haim et al., and further in view of Maas, III (U.S. 6,181,832 B1). Kruger, Bae et al., and Ben-Haim et al. teach all of the limitations as discussed above. They do not teach the use of a computer to reduce partial scan artifacts in an image. However, Maas, III teaches the use of a computer to reduce motion artifacts from image data (abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kruger, Bae et al., and Ben-Haim et al. to include the computer to reduce the motion artifacts from image data as evidenced by Maas, III. Such a modification will yield in a more accurate image if the patient inadvertently moves (C1, L35-46).



***Response to Arguments***

14. Applicant's arguments filed 7/23/2009 have been fully considered but they are not persuasive.

Applicants' attention is directed to pages 8-10 of the Office Action filed 5/27/2009, where the Examiner has already clearly addressed Applicants' attempt to distinguish the act of interpolation from extrapolation:

"16. Regarding Applicant's arguments with respect to Kruger in view of Bae et al., Applicants argue that Bae does not teach or suggest creating a second TCT dataset from a first TCT dataset (page 13; page 15, third paragraph). However, the Examiner informs Applicants that Bae et al. need not teach the aspect of a second TCT dataset. Kruger already teaches a TCT dataset. One of ordinary skill in the art would understand that Bae et al.'s teaching of reconstruction interpolation would mean that the Kruger's TCT dataset would be used to interpolate (and therefore also extrapolate – see next paragraph) data that could have been achieved had there been more sensors or samples of TCT data. Applicants admit that Bae et al. teach the interpolation of data for reconstruction intervals larger than 1mm (page 13, third paragraph). It is unclear how Applicants are interpreting this to be different from the instant inventions' determining of a second portion of the measurement surface different from the first portion. If one of ordinary skill in the art was to perform Bae et al.'s reconstruction interpolation on the TCT data taught by Kruger, there would be no doubt that the interpolation would generate data that corresponds directly to a portion of the measurement surface different from the first portion. One would not perform interpolation for a portion of the measurement surface the same as the first portion. Such an interpretation is not valid as it is counterproductive to the goals of interpolating data. When an interpolation for reconstruction is conducted, it yields data for the areas in between the

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areas covered by existing data. Therefore, the combination of Kruger and Bae et al. would result in a second set for a second portion of the measurement surface different from the first portion.

17. Applicants argue that "Bae et al. teaches interpolation of CT data...However, as clearly evident from the citations above, nowhere does Bae et al. suggest anything to do with extrapolation of data" (page 13, fifth paragraph). The Examiner asserts that interpolation in three dimensions is a type of extrapolation. As understood in colloquial terms, extrapolation involves creating new data from existing data. Interpolation involves creating data in between existing data, based on the existing data. Therefore, in three dimensional reconstruction, the teaching of interpolation certainly satisfies the definition of extrapolation. There may be applications where the nuances between interpolation and extrapolation is clear, such as a classic example of a 2D line graph on a rectangular coordinate system that involves the interpolation of data points in between the existing data points, or the extrapolation of data points beyond the maximum value data point of the independent axis. However, for the current application of reconstructing 3D TCT imaging data, the teaching of interpolating data would also be considered extrapolating data. Additionally, Applicants have not provided any valid arguments directed to precluding the use of a teaching of interpolation against the instant application's claim limitation of extrapolation, other than the mere statement of an unsubstantiated opinion. "

Applicants continue to argue the difference between interpolation and extrapolation (page 8, fifth paragraph - page 11, Arguments filed 7/23/2009). Examiner emphasizes that the Applicant's invention does not fall into a category where interpolation and extrapolation are defined as non-overlapping concepts. The fact that Applicants are performing "extrapolation" on 3D data in the embodiments as described in the instant application would be enough for one of ordinary skill in the art to see that this aspect of the invention can be read on by either interpolation or extrapolation. Additionally as elaborated in the above art rejection in view of Bae et al., the process of

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determining the second TCT set as amended in the claims can certainly at least be found to be obvious in view of Bae et al.'s teaching of interpolation of CT data.

### ***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELMER CHAO whose telephone number is (571)272-0674. The examiner can normally be reached on Mon-Thurs 11am-9pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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